REMARKS

In the Office Action mailed March 18, 2005 claims 1-27 were rejected. The March 18, 2005 Office Action has been carefully considered. By the present response, claims 1 and 17 have been amended, and claims 2, 3, 18 and 19 have been canceled. Upon entry of the amendments, claims 1, 4-17, and 20-27 will be pending in the present patent application. Reconsideration and allowance of all pending claims are requested.

Rejections Under 35 U.S.C. § 102

The Examiner rejected claims 1, 4-7, 10-13, 15-17, 20, 22, 25 and 27 under 35 U.S.C. § 102(e) as being anticipated by Mouli et al. (U.S. Patent Application No. 2004/008914, hereinafter "Mouli").

Independent Claims 1, 17 and Claims Depending Therefrom

By the present response, claims 1 and 17 have been amended to include the subject matter recited by claims 2, 3 and 18, 19, respectively, in order to particularly point out and distinctly claim the subject matter.

Mouli fails to specify that the substrate is either silicon carbide or gallium nitride.

Amended claim 1 recites, *inter alia*, a method for optical and electrical isolation between adjacent integrated devices. Claim 1 recites forming at least one trench through an exposed surface of a silicon carbide (SiC) or gallium nitride (GaN) semiconductor wafer by removing a portion of the semiconductor wafer material. Claim 1 also recites forming an electrically insulating layer on the sidewalls and the bottom of the at least one trench and filling the at least one trench by conformally depositing an optically isolating material. Claim 1 further recites planarizing the semiconductor wafer surface by removing the portion of the optically isolating material above the exposed surface of the semiconductor wafer.

Amended claim 17 recites, *inter alia*, a microelectronic device comprising at least two integrated devices, wherein the at least two integrated devices are located in a silicon carbide (SiC) or gallium nitride (GaN) substrate. Claim 17 further recites at least one trench in the substrate, wherein the at least one trench physically separates the at least two integrated devices, and the inside of the at least one trench is coated with an electrically insulating material and filled with an optically isolating material that is conformally deposited.

Mouli does not describe or suggest the use of silicon carbide or gallium nitride in a device as claimed. Rather Mouli describes only the use of a silicon semiconductor substrate. While silicon carbide and gallium nitride were apparently available to Mouli, no mention whatsoever is made of these materials in the document. Indeed, Applicants submit that such materials were either considered by Mouli as inappropriate for the devices taught, or were unfavored by Mouli. In either case, the reference does not teach the use of the materials, and thus cannot anticipate the claims.

Applicants therefore submit that claims 1 and 17 are allowable because Mouli cannot support a *prima facie* case of anticipation of claims 1 and 17 as amended. In particular, Mouli fails to disclose use of a silicon carbide or gallium nitride substrate as recited in amended claim 1 and 17. Accordingly, Applicants respectfully request the Examiner to reconsider and withdraw the rejection of the claims on this basis.

Rejections Under 35 U.S.C. § 103

The Examiner rejected claims 2, 3, 18, 19 under 35 U.S.C. §103(a) as being unpatentable over Mouli in view of Kwak et al. (U.S. Patent Application No. 2002/0074556, hereinafter "Kwak"). As noted above, the subject matter of these claims has been integrated into independent claims 1 and 17, respectively. Accordingly, the rejections are addressed here insomuch as they may affect amended claims 1 and 17.

The Teachings Of Mouli and Kwak Cannot Be Fairly Combined.

Mouli and Kwak teach different, and mutually exclusive solutions to a single problem. Rather than combining the teachings, as suggested by the Examiner, one skilled in the art would have no motivation whatsoever to exchange or substitute the solution proposed by Mouli with that set forth in Kwak.

Mouli teaches a specific isolation technique for reducing dark current in complimentary metal oxide semiconductor (CMOS) sensors. In particular, Mouli relates generally to semiconductor devices, and more particularly, to trench isolation technology for use in semiconductor devices, including CMOS image sensors.

Mouli teaches that in a CMOS image sensor, that includes a focal plane array of pixel cells, the active elements of a pixel cell perform the necessary functions of photon to energy conversion, accumulation of image charge, transfer of charge to the floating diffusion node accompanied by charge amplification, resetting the floating diffusion node to a known state before the transfer of charge to it, selection of a pixel for readout, and output and amplification of a signal representing pixel charge from the floating diffusion node. *See, e.g.,* Mouli, paragraph [0004]. A photon impinging on a particular pixel of a photosensitive device may diffuse to an adjacent pixel, resulting in detection of the photon by the wrong pixel, i.e. cross talk. Therefore, for CMOS image sensors, which are intentionally fabricated to be sensitive to light, it is advantageous to provide both electrical and optical isolation between pixels.

As a solution to this problem, Mouli teaches, in a silicon substrate, a structure for isolating areas between adjacent regions by filling trenches with an electrically insulating liner formed along at least sidewalls of the trench and then further filling it with a conductive material that serves as an optically insulating layer. This prevents the cross talk between the neighboring pixels. The optically insulating layer is then etched away to planarize the semiconductor surface.

Kwak discloses the method for fabricating a gallium nitride (GaN) based group III-V nitride semiconductor light emitting diode. The invention generally relates to a semiconductor light-emitting device and a method for fabricating the same, and more particularly, to a GaN based Group III-V nitride semiconductor light-emitting device and a method for fabricating the same.

Kwak teaches a method of fabricating a light-emitting device that begins by sequentially forming a first compound semiconductor layer, an active layer, and a second compound semiconductor layer, which are for inducing light emission, on a high-resistant substrate. Kwak further teaches forming a light-transmitting conductive layer on the second compound semiconductor layer. Kwak also disclosed etching a region of the high-resistant substrate to expose the first compound semiconductor layer and further forming a high-shielding conductive layer to cover the exposed region of the first compound semiconductor layer.

Kwak further addresses the problem of device isolation, the same problem addressed by Mouli. However, the solution adopted by Kwak is entirely different from that espoused by Mouli. For example, in describing the embodiment shown in Figure 44 of the reference, in paragraph 0139, Kwak states:

> In particular, as shown in FIG. 44, in forming the via hole 332 in the high-resistant substrate 300, at the same time a trench 334 for device isolation can be formed in the boundary region between light-emitting devices. By doing so, a separate diamond cutting process for device isolation is not necessary, and the light-emitting devices can be separated by pushing the opposite side to the side where the trench 334 is formed.

There would be no reason to substitute this isolation solution with that taught by Mouli. Certainly, the references do not support such substitution. In particular, these solutions are inconsistent with one another as Kwak only discloses a trench to provide device isolation but does not disclose a need for optical isolation materials to provide

optical isolation between semiconductor devices on gallium nitride substrates. On the other hand, Mouli discloses the use of optical isolation materials to provide optical isolation between metal oxide devices. Therefore, a combination of these references would make the isolating trenches superfluous for optical isolation. Hence, the references do not support a *prima facie* case of obviousness for one skilled in the art. Thus, Applicants respectfully request that the rejection based upon the Mouli-Kwak combination be withdrawn.

Other Dependent Claims

The Examiner further rejected claims 8-9, 14, 21, 23, 24 under U.S.C. §103(a) as being unpatentable over Mouli in view of Lee (U.S. Patent No. 5,498,566, hereinafter "Lee").

The Examiner further rejected claim 26 as being unpatentable over Mouli in view of Meksavan et al. (U.S. Patent No. 6,547,146, hereinafter "Meksavan"). All of these claims depend directly or indirectly from an allowable base claim. Accordingly, these claims are believed to be clearly patentable at least by virtue of their dependency from an allowable base claim.

Conclusion

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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